RIAP BULLETIN

Volume 3, Number 1-2 **January—June 1997**

EDITORIAL

THE PROBLEM OF PALEOVISITS: A KNIGHT AT THE CROSSROADS

This RB issue (as well as the next one) deals with the problem of paleovisits (PV) — hypothetical extraterrestrial expeditions to the Earth in ancient times. This problem has arisen as a result of the contradiction between the theoretical possibility of such events and the lack of their indubitable traces. In short it may be formulated as the question of whether the Earth had been visited in the past by extraterrestrials, and if so, what these visits were like.

Science did not pay much attention to this problem. In the late 1950s Dr. Matest M. Agrest, a mathematician and participant of the Soviet nuclear project, tried to convince the scientific community that the paleovisit hypothesis was worthy of serious attention[1], but failed for a number of reasons. One of these was the formation of the first ("radio") paradigm of SETI studies.[2] It is not uncommon that a new paradigm expels competitive approaches from science. The paleovisit idea has found its "refuge" among "amateurs", in the field of the parascientific Ancient Astronaut Theory (AAT).[3]

It was only the scientific consideration of the "Fermi paradox" (the "if-they-existed-they-would-be-here" thesis) that partly cleared the way to a serious discussion of this problem within science. This argument has been reconsidered since 1975, causing the boat of SETI studies to change course considerably. It led some scientists (to begin with M.H.Hart who was the first to raise this dilemma definitely and bluntly in his work[4]) to the conclusion of our civilization's cosmic solitude, and others, to the assumption of an actual presence of extraterrestrials in the Solar System. As a result, there was laid a foundation for a second SETI paradigm, fundamentally different from the first one. In it interstellar flights, not interstellar radio communications, are supposed to be the main method of contacts between cosmic civilizations. Since we terrestrials have no starships as yet (the "Pioneer" and "Voyager" probes do not count, of course), we should look for extraterrestrial probes/starships/cosmic stations moving through (or staying in) the Solar System at present — or for traces of such visits in the past.[5]

However the words "in the Solar System" proved to be not sufficiently indefinite to justify fully such an approach in the eyes of the scientific community. Our planet is certainly a part of the Solar System; but any ET probes near the Earth are indistinguishable from UFOs, and any supposed traces of past ET visits to the Earth are legitimate spoils of AAT amateurs. Few scientists would dare to take the risk to look so unscientific. In result, the "second SETI paradigm" has taken a place at the periphery of SETI studies, being admissible "in principle", but not affecting as yet the research policy of the SETI establishment. It is developed basically in its "cosmic" aspects (the further away an object of study, the better), except, perhaps, for an interesting "intermediate" research direction — the search for ET artifacts among the so-called pseudometeorites. From time to time this direction attracted the attention of some investigators; recently it was theoretically substantiated by A.Arkhipov.[6]

As for the problem of paleovisits as such (that is, past ET visits *to the Earth*), it still remains *alien* to science. PV investigators are concentrating around the Ancient Astronaut Society (AAS) that was founded in 1973 by the American lawyer Dr. Gene M. Phillips. Being a free association of lay persons and specialists in various fields of science and technology, the Society gives its members (at its regular conferences, as well as on the pages of its two journals) broad oppor-

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Published Quarterly by Research Institute on Anomalous Phenomena
P.O.Box 4684, 310022 Kharkov-22, UKRAINE
Distributed Free Among RIAP Fellows abd Donators

tunities for generating original PV-related ideas and — alas — lesser ones for their critical evaluation.

More than once I criticized weak points of the parascientific approach to the paleovisit problem.[7] And I must admit this criticism still remains basically valid. But the problem itself is a real and serious one. If the scientific community in general and scientific establishment in particular stubbornly pursue an "ostrich policy" in respect of it, they must thank nobody but themselves for the results.

Of course, a great part of "cosmic" interpretations of ancient texts and monuments, suggested by proponents of the AAT is rather naive (and yet more naive is their firm belief that the AAT is a miraculous instrument that can easily solve all enigmas of the past). But where science stands still, these proponents are moving. An open mind is no guarantee of a correct course of motion, but a closed one is a guarantee of the reverse.

A rational attitude to the problem of paleovisits (and science is the rational form of knowledge *par excellence*, isn't it?) lies in serious research work in this field, not in mere allegations, expressed before — or even instead of — any investigations. For our institute paleovisitological studies are one of the central directions of research. We are engaged both in theoretical work in this area, and in examination of supposed ET traces.

By analogy with the well-known division of historical sources into direct and indirect, one may select two types of these possible traces. These may be also direct (for inst nce, the remains of devices, or skeletons of extraterrestrial beings) and indirect (any alteration of a terrestrial object resulting from a paleovisit, such as: traces of radioactivity; evidence of genetic manipulations in living beings; va ious images of extraterrestrials made by earthlings; descriptions of them in oral or written texts; etc.).

Direct PV traces are of special interest. It is a general opinion among SETI-specialists that only "an undeniable artifact is a necessary and sufficient condition to prove a direct contact".[8]

Such a rigoristic point of view seems to be rather disputable, but importance of di ect PV traces is quite evident. There exist a number of supposed ET artifacts.[9] Although ny suspicious object of such type would *a priory* deserve serious examination, in practice only a few of them have been studied in detail. One of these rare exceptions is the investigation of the so-called Black Ball, made some years ago in Moscow by a research team under the guidance of Dr. Valentin N. Fomenko, now a member of the RIAP Scientific Council. Due to certain ci cumstances, the work was not accomplished in full, but the results obtained appear to be very intriguing. I think, they will be of interest to RB readers. In this issue of our bulletin we publish Dr. Fomenko's research report on his investigation, and in the next one a sequel to it.

The reader will also find here a very informative — even if preliminary — report of Robin Collyns, a well-known researcher and author from New Zealand, about a baffling object, found in his country. Unfortunately, this find has not been thoroughly studied as yet, but at least it is at the disposal of an experienced researcher. Let's hope, it will not disappear without trace, as happens sometimes with such finds, and that in time it will be examined.

Curiously enough, some self-styled "experts", demanding to be shown an "indubitable ET artifact", do not want, at the same time, even to look at strange but real objects whose origin remains unknown. Does the word "indubitable" mean in fact "not requiring any intellectual efforts to understand its nature"? If so, the paleovisit idea has a good chance to remain a sort of heresy for a long time, if not for ever. Well, as it was once said (with regard to another problem) by the famous Soviet anomalist Professor Boris F. Porshnev, "formerly it seemed that some "defendants" would have to bring a "proof" to some "judges", after which these experts would deign to take further development of the studies into their own scholarly hands. Now it is obvious that only the "defendants" are the true specialists and experts in the field. Thei community will gradually grow up... And the "judges" will doze, sitting in their armchairs in an empty hall."

Notes and References

[1] Agrest M.M. The Cosmonauts of Yore — In: *Na Sushe i na More*, Vol. 2, Moscow, 1961.

[2] See: Rubtsov V.V., Ursul A.D. *The Problem of Extraterrestrial Civilizations*, 2nd ed., Kishinev: Shtiintsa, 1987, p. 224.

[3] The term "parascientific" is here neither condemning, nor appraising at all. Parascience is just another component of the cognitive system of our terrestrial civilization. It performs its own (important enough) functions in the eternal game between Man and the World. For details, see: Rubtsov V.V., Ursul A.D. *Op. cit.*, pp. 269–271.

[4] Hart M.H. An Explanation for the Absence of Extraterrestrials on Earth. — *Quart. J. of the Royal Astronomical Society*, 1975, Vol. 16, No. 2.

[5] See: Rubtsov V.V., Ursul A.D. *Op. cit.*, pp. 42, 51, 195–252.

[6] See: Arkhipov A.V. On the Possibility of Extraterrestrial-Artefact Finds on the E rth. — *The Observatory*, 1996, Vol. 116, No. 1132.

[7] See, for example: Rubtsov V.V. Open Letter to Ancient Astronaut Theory Proponents. — *Ancient Skies*, 1984, Vol. 11, No. 4.

[8] Drake F.D. The Radio Search for Intelligent Extraterrestrial Life. — In: *Current Aspects of Exobiology*, N.Y.: Pergamon Press, 1965, p. 344.

[9] For some very interesting recent finds see: Hausdorf H. Sensationeller Fund in Russland. — *Ancient Skies* (Deutsche Ausgabe), 1997, 21. Jahrgang, Nr. 2.

—Vladimir V. Rubtsov

INFORMATION ON THE RESULTS OF PRELIMINARY STUDY OF THE BLACK BALL AS A POSSIBLE EXTRATERRESTRIAL ARTIFACT

V.N.Fomenko

1. Introduction

Finding reliable material evidence of visiting the Earth by expeditions of advanced extraterrestrial civilizations in the past is of principal importance for solution of the following fundamental scientific problems:

- prevalence of life in the Galaxy;
- existence of extraterrestrial civilizations;
- possibility of interstellar flights and contacts between neighboring civilizations;
- surmountableness of the civilization development crises;
- possibility of visiting the Earth at present (the ET hypothesis of the UFO origin).

The objects of supposedly alien origin found till now (the steel parallelepiped in a coal seam [1], the screw in a stone [2], etc.) were not studied in time, and thus their alien origin was not proved scientifically. For this reason study of the Black Ball of supposedly alien origin with modern scientific methods is of much importance.

The Black Ball was investigated on the initiative of I.G.Petrovskaya (Institute for Space Studies of the USSR Academy of Sciences), with active cooperation of D.A.Menkov (Moscow Physical Engineering Institute), by V.N.Fomenko, a senior research fellow at the "Soyuz" Scientific and Industrial Association.

As far as is known, the Black Ball was found in 1975 in West Ukraine in a clay quarry at a depth of about 8 meters. The age of the clay layer is of the order of 10 million years.

It was discovered by an excavator who noticed the unusually regular shape of the Ball. When he struck it against the edge of a bucket, the Ball did not split, but a piece broke away, exposing a black glass-like substance. The worker took the thing home and gave it to his son, a schoolboy, from whom it was taken to the local museum of regional studies by a school teacher.

For three years the Ball was kept at the museum, but then it was taken away by the teacher's son Boris Nikolayevich Naumenko who worked at the Earth Physics Institute of the USSR Academy of Sciences.

The supposed age and the regularity of the Ball's shape inspired the idea of its extraterrestrial origin at the earliest stages of its investigation. Subsequently the Ball came to be at the disposal of Moscow parapsychologists who seemed to "reveal" the possibility of obtaining the so-called "bioenergy" from it. As they claimed, the Ball picked and accumulated the energy from a field generated by highly advanced extraterrestrial civilizations in outer space. The parapsychologists extracted this "energy" by rubbing the Ball with hands.

The author of the report first saw the Ball and knew of its hypothetical origin on May 13, 1979, when he went to the site of a UFO landing near the village of Popovka (three kilometers north of the station of Khripan of the Kazan Railway), together with the F.Yu.Zigel UFO study group. The Ball was brought there by a Mr. Deev, a parapsychologist, to "charge it with energy" from the field supposedly remaining at the UFO landing site.

In October of 1979 the Ball was taken by D.A.Menkov from B.N.Naumenko and given to V.N.Fomenko so that it should be studied by scientific methods.

The supposed extraterrestrial origin of the Ball dictated extreme caution in the studies. The desire to protect the Ball from damage and keep it suitable for further studies made researchers develop a programme of investigations using only nondestructive methods.

A large programme of study of the Ball was planned. It was expected that the data resulting from these investigations would allow to propose well-grounded hypotheses on the properties and the structure of the Ball and corroborate or reject the supposition of its extraterrestrial origin. In the case of corroboration of the Ball's extraterrestrial origin these investigations could provide grounds for a programme of further studies.

However, a week after the Ball was received from B.N.Naumenko and was started to be studied, it had to be returned to him at his urgent demand, and therefore the programme of studies could not be implemented. In this report we present the results only of initial stage of the programme.

2. Results of the studies

2.1. Configuration of the Ball

An external view of the Ball is seen on the photographs presented in Figs. 1 and 2 (page 4).

Arc approximation of the Ball contour in the meridian section suggested that the Ball had the shape of an ovoid with the longer axis (the axis of symmetry) measuring 87.5 mm and the midsection diameter (the largest section perpendicular to the axis) of 84.7 mm. The elongation (the ratio of the axis length to the midsection diameter) is 1.033. The deviation of the Ball shape from round is visible by eye.

The outer contour of the Ball may be approximated meridionally (accurate within the width of a pencil line made by hand, i.e. approximately 0.3–0.4 mm) by three arcs (see Fig. 3).

The narrow end of the ovoid, from the point A to A′, at the arc $\alpha = 150°$, has the radius of curvature of 43.8 mm. The broad end of the ovoid between the B and B′ points, at the arc $\beta = 90°$, is approximated by the radius of 47.8 mm.



Fig. 1. The Black Ball
as viewed from the side.

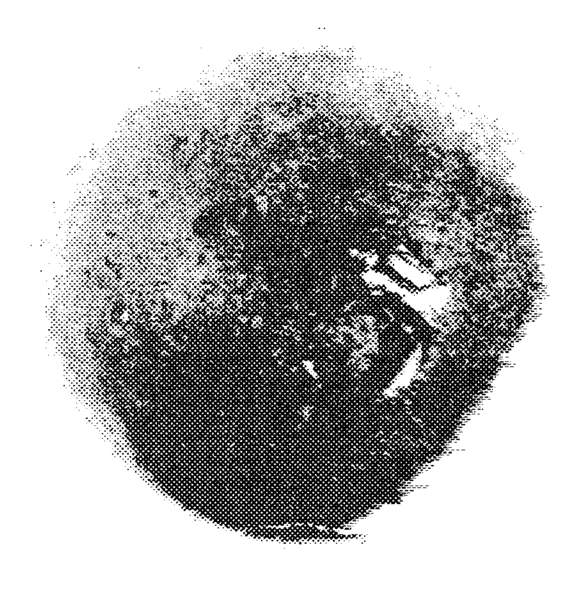


Fig. 2. The Blacl
as viewed from its narrow

The distance between the centers of curvature is 3.6 mm.

The side belt from A to D and from A′ to D′ is approximated by arcs of the radius of 51 mm, their centers being 7.3 mm away the axis and 5.5 mm above the center of curvature of the broad end.

The Ball volume as calculated on the assumption of its ideally spherical shape with the diameter equal to the arithmetic mean of the axis and mid-section sizes is 334.6 cm^3.

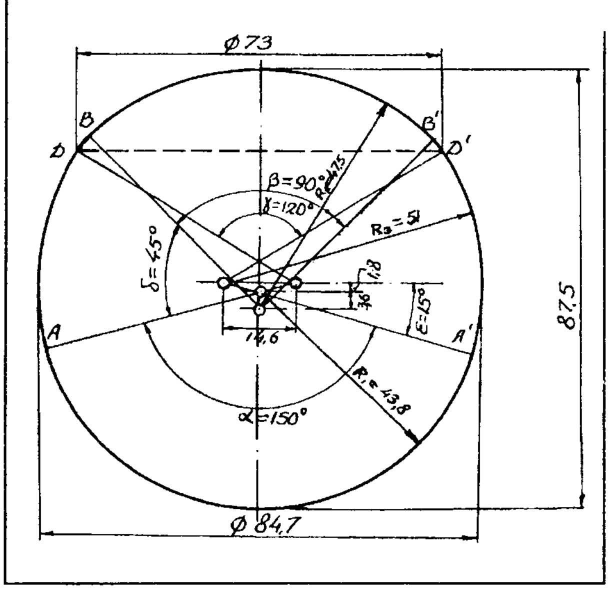


Fig. 3. The shape and dimensions of the Ball's meridional section approximated by arcs.

2.2. The Ball surface

By the time of the investigation, the Ball surface was two thirds covered with a relatively soft layer of yellow-grey substance, obviously produced by leaching. On one third of the surface it was wiped off (see Fig. 2). Gradual thinning of this layer to the edges, there being no signs of mechanical treatment (microscope examination revealed only light scratches of occasional directions), seems to suggest differences in the leached layer thickness due to unevenness of water arrival to the Ball surface during its stay in the ground. However the area of the dark surface noticeably enlarged since May till October of 1979, which gives reasons to believe that the leached soft layer was abraded from some part of the Ball by the hands of the parapsychologists as they "gathered" "energy" from it.

On two spots measuring approximately 10 x 10 and 7 x 5 mm the le layer was chipped o tween May and Octob 1979). This is well see Fig. 1. There are a smaller chips, of sev millimeters or smaller. seen in these places that maximum thickness of leached layer is sc 1.5 mm.

There are two marks the surface where cnip glass have been broken by strong impacts.

A first mark must h been the result of the imp against the edge of a buc It can be seen on the narro end of the Ball (see Fig. It is noteworthy becau there is a depression th spreads from it as a regula arc of constant depth. The arc has the internal radius of about 10 mm, a width of 6 mm, and a depth of 2 mm.

A second trace of a strong blow near the equator appeared between May and October o 1979. The largest "scale" on it has a surface wit pit-like steps, characteristic of glass. At the centers of the blow sites there are deep-going cracks They can be seen to depths of 0.5–1 mm, suggesting some transparence of the Ball's shell tc visible light.

On the butt-end of the Ball there is an intermittent circle formed by three grooves, whose center coincides with the axis of symmetry o the Ball. The circle is 73 mm in diameter. It lie in the plane, strictly perpendicular to the axis o symmetry. Each groove's section is slighth

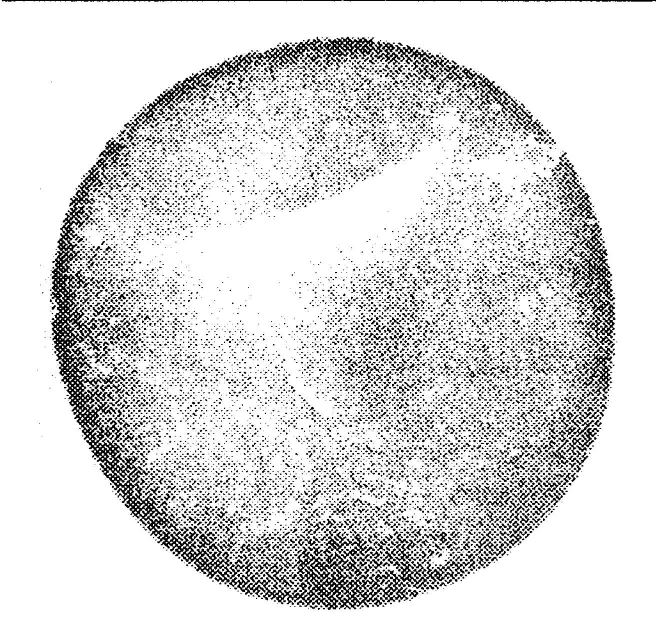


Fig. 4. An X-ray photograph of the Ball (a positive print, made from an X-ray film). The axis of symmetry of the Ball runs at an angle of 17°30' to the plane of the film.

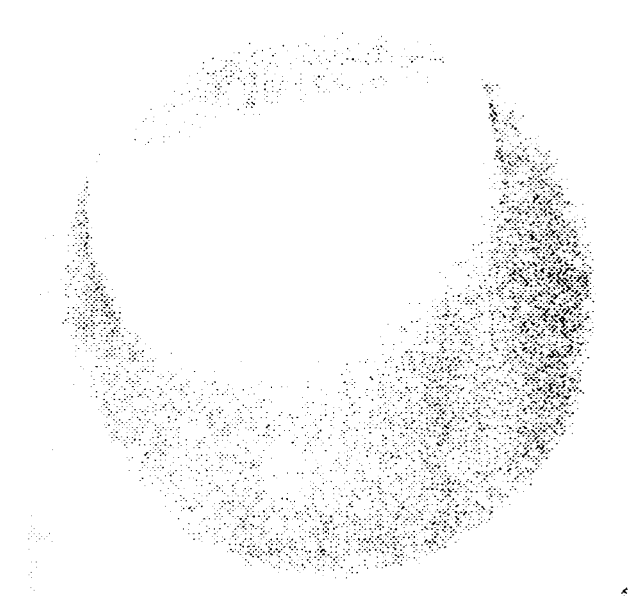


Fig. 5. The same X-ray photograph of the Ball, printed at under-exposure to reveal the outline of the core's paraboloidal part.

sinusoidal, up to 1.5 mm wide and up to 0.4 mm in depth. The yellow-grey leached layer is missing from the grooves, their surface being smooth, shining, glass-like. It should be mentioned that the layer cannot have been abraded, since the bottom of the grooves lies below the surrounding surface.

One can note on the surface of the Ball thin (about 1 mm wide) dark stripes directed latitudinally and approximately parallel to each other. These stripes are either lacking the leached layer (like the bottom of the grooves), or it is much thinner.

The leached yellow-grey layer is relatively soft and fragile. It can be easily scratched by a steel needle, forming small crumbs. The surface layer of the Ball in the areas where the leached layer was chipped off or effaced is harder, but can also be scratched by a needle. It is only within the arc-like depression that the needle cannot scratch the surface.

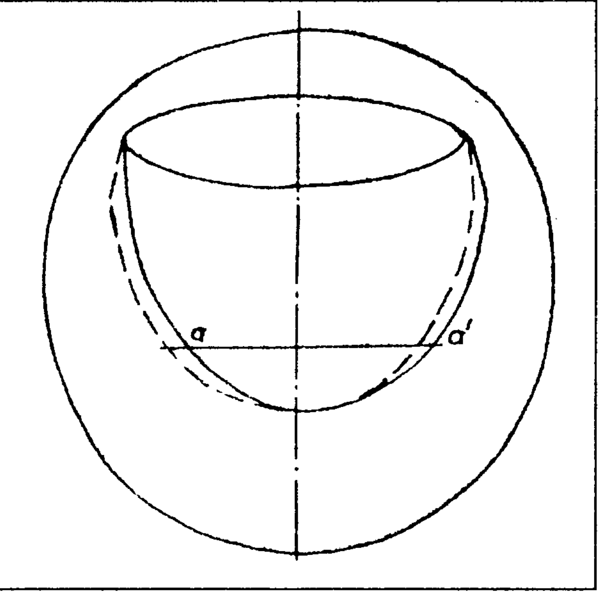


Fig. 6. The discrepancy between the outlines of the cylindrical and paraboloidal parts of the core shown as a solid and a dashed line. Two tracings were made from an X-ray photograph, one of them was turned over and then superimposed on the other.

2.3. Transparency of the Ball's shell

It proved to be impossible to determine visually whether there was a core or inclusions within the Ball. There was made an attempt to examine the interior of the Ball with the help of a powerful light source (a halogen lamp). The result was totally negative. This could be due either to an opaque core in the Ball, having a non-reflecting surface, or to strong absorption of the visible light in the Ball's shell.

2.4. The Ball's structure

An X-ray study of the Ball (with an industrial X-ray unit RUP 150/300) discovered within the Ball an inner core, shaped like a half of an egg (see Figs. 4 and 5). More precisely, the outline of the core is formed by two paraboloids of revolution, 11 and 22 mm high respectively, and a cylindrical part, 11 mm high and 58.3 mm in diameter. The ratio of the core's height (48.3 mm) to the diameter of its cylindrical part is 0.75.

The cylindrical part has a saucer-shaped end face, perpendicular to the axis of the core. Its concavity is some 3–4 mm.

The edge of the end face lies in the plane of the grooves forming a circle with a diameter of 73 mm on the surface of the Ball. The axis of the core deviates from the axis of the Ball by an angle of 3°45′.

In Figs. 5 and 6 one can see that on one side of the core its cylindrical part is smoothly conjugated with the paraboloid, whereas on the other side there is a break. The coordinates of the

paraboloidal part of the core, taken at 1-mm interval and laid off in the logarithmic coordinate system, form two straight lines. This implies that two parabolas join at the points a and a' (Fig. 6). After finding this somewhat strange regularity the calculation was repeated and proved to be error-free.

It is seen from Fig. 7 that within the thickness of the "lid" that covers the end face of the core there are small circular and ellipsoidal bubbles. Their total volume is 155.3 mm^3. This is equal to the volume of one bubble 6.66 mm in diameter. Comparing Figs. 5 and 7, one can make sure that all the bubbles are located only in the "lid". These bubbles are hollow. At the same time, the core consists of a substance that absorbs X-rays 4 times less intensively, than the shell.

Contours of the Ball and core were traced from the negative of an X-ray photograph. Then, starting from these data, the Ball's and core's contours were plotted on cross-section profile paper to a scale 10:1, the contours were smoothed off with a French curve, and the coordinates of the contours were taken at 1-mm intervals (see Table 1). This allowed to obtain an accuracy of a hundredth part of a millimeter.

Figures in Table 1 are derived with regard to the enlargement of the picture due to X-rays divergence. The X-ray source in the RUP 150/300 device is at a distance of 1000 mm from the film. The Ball's radius at its equatorial section is 42.35 mm; the distance from the film to the upper plane of the film cassette is 2.5 mm. Therefore the picture's size must be reduced by a factor of K = (1000–44.85)/1000 = 0.95515. Accordingly, the distances between the sections in Table 1 were decreased from 1 mm to 0.955 mm.

A layer of the Ball's substance between its i-th and (i+1)-th sections is an elementary layer. The volume of the Ball's core (V_{CS}), determined by numerical integration of the volumes of elementary layers proved to be equal to 83.038 cm^3.

The volume of the Ball, figured out with the same method (V_{BS}), is 333.923 cm^3. This figure is sufficiently close to the Ball's volume calculated on the assumption of its ideally spherical shape (see Section 2.1): V_{BA} = 334.60 cm^3. The difference is only 0.677 cm^3, or 0.2%. At the same time, the Ball's true volume determined from the water displacement (V_B) is 319.914 cm^3, that is 14 cm^3 less. $V_B = 0.958 V_{BS}$. Obviously, it is due to a departure of the Ball's shape from axial symmetry. The same is probably true for the core's shape and, therefore, the true volume of the core is $V_C = 0.958 \times 83.038 = 79.555$ cm^3 ≤ 80 cm^3. The core comprises 24.9% of the Ball's volume.

2.5. Density of the Ball and core

The average density of the Ball may be calculated as $\rho = P_B/V_B$, where P_B is the Ball's weight, and V_B is its true volume.

The Ball weighs 617.220 g, its true volume is 319.914 cm^3, and therefore its density (at 21°C) is 1.934 g/cm^3. This figure is much less than the usual density of glass that ranges from 2.30 g/cm^3 for light crown glass to 6.58 g/cm^3 for super-dense flint glass. It is also less than the density of quartz (2.30g/cm^3) and obsidian (2.21–2.24 g/cm^3)[3].

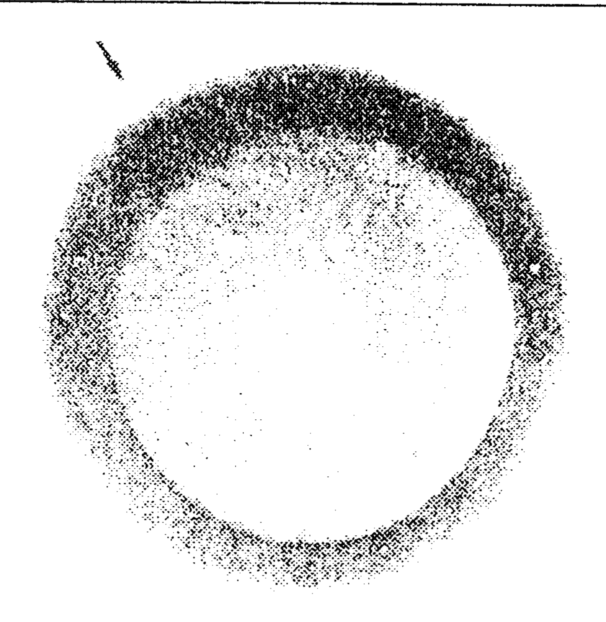


Fig. 7. An X-ray photograph (a positive print) of the Ball as viewed in the direction of its axis of symmetry.

To determine densities of the Ball and core, not applying to a priori assumptions about their composition (what remained unknown, as the Ball was much too soon taken away by its owner), we used a method that is based on information about location of the Ball's center of gravity.

Unfortunately, we have had time to determine the location of the center of gravity only with one, a relatively rough, method; therefore, these results can be considered only as preliminary.

The Ball with a line drawn with a pencil in a meridional direction was placed on a support (a small ball from a ball-point pen), so that the Ball's greater axis was parallel to the horizon, and the Ball itself was at the equilibrium state. Before the Ball there were suspended a plumb-line and a bob, aligned with the support. An experimenter marked the corresponding point on the meridional line. After that he determined the distance between the Ball's poles and the mark.

To improve accuracy of this measurement, it was repeated three times with different experimenters and meridians. The spread of the distances proved to be 1.5 mm. The average distance from the butt-end pole to the Ball's center of gravity was:

X_B = 51.56 mm

Densities of the Ball's shell and core may be found from the following system of equations:

$$Q_B = Q_S + Q_C = \gamma_S V_S + \gamma_C V_C \quad (1)$$

$$M_B = Q_B X_B = M_S + M_C = \gamma_S V_S X_S + \gamma_C V_C X_C \quad (2),$$

Table 1.

Coordinates (in mm) of the Ball's outer contour (R) and the core's contour (r) at the i-th sections.

i	R(i)	r(i)	i	R(i)	r(i)
1	8.6	0	47	42.25	24.57
2	12.1	0	48	42.20	24.08
3	15.4	0	49	42.11	23.56
4	17.1	0	50	41.97	23.00
5	20.3	0	51	41.82	22..41
6	22.1	0	52	41.7	21.76
7	23.63	0	53	41.5	21.08
8	25.17	0	54	41.32	20.27
9	26.56	0	55	41.11	19.40
10	27.75	0	56	40.9	18.43
11	28.98	0	57	40.66	17.31
12	30.1	0	58	40.40	16.13
13	31.1	0	59	40.1	14.87
14	32.06	0	60	39.8	13.5
15	33.00	0	61	39.45	11.9
16	33.83	0	62	39.13	10.23
17	34.63	0	63	38.76	8.20
18	35.35	0	64	38.40	5.4
19	36.00	0	65	38.03	0
20	36.00	29.15	66	37.6	0
21	37.17	29.15	67	37.15	0
22	37.65	29.15	68	36.7	0
23	38.12	29.15	69	36.2	0
24	38.60	29.15	70	35.66	0
25	39.00	29.15	71	35.1	0
26	39.40	29.15	72	34.46	0
27	39.80	29.15	73	33.85	0
28	40.11	29.15	74	33.15	0
29	40.43	29.15	75	32.43	0
30	40.70	29.15	76	31.6	0
31	40.97	29.13	77	30.83	0
32	41.20	29.1	78	29.90	0
33	41.40	29.0	79	28.95	0
34	41.60	28.9	80	27.87	0
35	41.72	28.8	81	26.80	0
36	41.90	28.5	82	25.57	0
37	42.0	28.3	83	24.30	0
38	42.1	28.0	84	22.86	0
39	42.16	27.7	85	21.35	0
40	42.2	27.4	86	19.72	0
41	42.3	27.1	87	17.73	0
42	42.33	26.7	88	15.63	0
43	42.35	26.33	89	13.10	0
44	42.35	25.9	90	10.08	0
45	42.33	25.5	90	10.08	0
46	42.30	25.03	91	5.95	0

where Q_B, Q_S, Q_C are weights of the Ball, shell, and core respectively; M_B, M_S, M_C are torques (or moments) of the Ball, shell, and core in relation to the butt-end pole of the Ball; γ_S, γ_C are densities of the shell and core; V_S, V_C are volumes of the shell and core; X_B, X_S, X_C are distances from the Ball's butt-end pole to the centers of gravity of the Ball, shell, and core respectively.

Starting from the data for the contours of the Ball's and core's surfaces (see Table 1), we can determine volume of an i-th elementary layer of the shell (V_{Si}) and the core (V_{Ci}):

$$V_{Si} = \pi (R_i^2 - r_i^2) \Delta. \quad (3)$$

$$V_{Ci} = \pi r_i^2 \Delta \quad (4),$$

where R_i is the distance from the axis of symmetry to the Ball's contour at its i-th section; r_i is the distance from the axis to the core's contour at its i-th section; Δ is the thickness of the elementary layer (the distance between i-th and (i+1)-th sections).

With the same data it is possible to determine moments of an i-th elementary layer of the shell (M_{Si}) and the core (M_{Ci}) in relation to the butt-end pole of the Ball:

$$M_{Si} = \pi \Delta (R_i^2 - r_i^2) \gamma_S x_i \quad (5)$$

$$M_{Ci} = \pi \Delta r_i^2 \gamma_C x_i \quad (6),$$

where x_i is the distance from the Ball's butt-end pole to its i-th section.

Rewriting Eqs. (1) and (2) in terms of Eqs. (3), (4), (5), and (6) we obtain:

$$Q_B = \pi\Delta\left[\gamma_S \sum_{i=1}^{91} (R_i^2 - r_i^2) + \gamma_C \sum_{i=20}^{64} r_i^2\right] \quad (7)$$

$$M_B = Q_B X_B = \pi\Delta\left[\gamma_S \sum_{i=1}^{94} (R_i^2 - r_i^2) x_i + \gamma_C \sum_{i=20}^{64} r_i^2 x_i\right] \quad (8)$$

The moments of the Ball, shell, and core, numerically calculated on a computer by equations (7) and (8) are as follows:

M_B = 3182.121 g·cm
M_S = 1093.62 γ_S g· cm
M_C = 280.306 γ_C g·cm

When solving this system of equations, we obtain:

γ_S = 4.08 g/cm^3
γ_C = **– 4.58 g/cm^3**,

or:

Q_S = 980.665 g
Q_C = **–364.362 g**

The result obtained is very strange indeed: the core's density is negative. Do we deal here with a substance of a negative mass?

To check this result and to determine an experimental error of the Ball's center of gravity (COG) location that could have eliminated this paradox, a computer simulation of the situation was run. It was found, however, that even assuming a zero density of the core, the experimental error must have been 5.546 mm. Since the dispersion of the COG points was only 1.5 mm (the standard deviation σ = 0.884 mm), the probability of a triple random deviation from the true COG location that would have been as great as 6.26σ is not more than 10^{-25}.

But the core is not just a cavity inside the Ball; it is filled with a substance that absorbs X-rays only four times less intensively than the shell. Assuming that absorption of X-rays by a substance is directly proportional to its density, the latter can be estimated at 1 g/cm^3. But then X_B would have been equal to some 44 mm (the error some 8 mm). The probability of such an error is even less than 10^{-25} what makes it improbable.

3. Discussing the results

Since the Ball was investigated with the aim to verify the hypothesis of its extraterrestrial origin, the results are discussed in the same context.

It is known that naturally occurring spheres, spheroids, and ovoids are either rather small (drops of water, spherulites that are formed in some minerals, fruits, eggs of birds and reptiles, small organisms living in water), or very big (stars, planets and their satellites). Because of this, in particular, the stone balls up to two meters in diameter, found in some regions of Central America, are believed to be human-made.

The Ball is too big for naturally-formed spherulites, and its black glass-like substance does not seem to be natural either. There is therefore a reason to assume its artificial origin; and the Ball's age suggests that it was made by non-terrestrial beings.

In this connection, we start with an analysis of the Ball's shape and dimensions.

3.1. Characteristics of the Ball's shape and dimensions

Close inspection of the Ball's contour approximated by arcs (Fig. 3) shows that each of these arcs is a multiple of 15°, what is equal to the 24th part of a complete circle. It is not consistent with the division of the circle into 360 degrees, not to the division of it into 32 points, accepted as standard in navigation, nor to the 16 points, accepted in meteorology.

This fact suggests that the Ball's designer, if any, may have used the number 24 as the radix of his system of numbers as well as of his system

of measurements. In the latter the unit of angular measurements (one BAU = the Ball's Angular Unit) was equal to 15°, or the 24th part of a complete circle.

True, the arcs that are multiples of some fractions of the circle occur both in the animate (flowers, fruits, star-fish, etc.) and inanimate (crystals) nature. Therefore, this fact cannot be considered as a proof of the Ball's artificial origin.

That is why we have tried to check if the base-twenty-four system of numbers is also characteristic of the Ball's linear dimensions. We took as the unit of length the 24th part of the length of the Ball's greater axis (the axis of symmetry), that is 3.65 mm. It turned out that all the radii of the arcs, the distances between their centers, as well as the core's dimensions, were in fact multiples of 3.65 mm (one BLU = the Ball's Linear Unit). The only exception is the size of the Ball's midsection. One can concede, however, that the Ball's designer preset the locations of the arcs' centers and their radii in whole numbers of BLU, obtaining the radius of the Ball's midsection as a derived quantity.

It is hardly probable that all these figures proved to be multiples of the same linear unit just by pure chance. Equally significant is the fact that the height of the Ball's core is equal to 1/2 of the height of the Ball's axis of symmetry, and the diameter of the core is equal to 3/4 of it.

The base-twenty-four number system is one of the most perfect. The base of our common number system — 10 — is divisible only by 2 and 5, whereas 24 has six divisors: 2, 3, 4, 6, 8, and 12, what is of much use for some calculations.

Studying tables of the length units that were used at different times by different peoples [4; 5], we could not find the units equal to 87.5 mm, or to 3.65 mm. Besides, there were used the number systems based on 2, 5, 10, 12, 20, 40, 60 [6], but not on 24.

Thus, the Ball's smooth surface, its regular form, relations between the arcs, approximating the contour of the Ball's meridional section, as well as the fact that the curvature radii, distances between the arcs' centers, and the core's dimensions are multiples of the same length unit (3.65 mm), obviously indicate that the Ball was purposefully designed. The design procedure did not probably differ very much from those used in the present-day engineering. At the same time, the Ball designer used the number system, as well as the angular and linear units, that are foreign to the terrestrial cultures we know of. This fact testifies — even if with some ambiguity — that the Ball was made on another planet (or at least by extraterrestrial beings).

3.2. The age of the Ball

The Ball can be dated by the age of the clay layer in which it was found. As stated above (see Introduction), the clay layer is dated by geological methods at some 10 million years.

However, one can argue that the Ball got there by accident (say, it lay near or even on the earth surface and fell into the clay quarry). So, it makes sense to evaluate the Ball's age with an independent method and, if the result does not differ very much from the geological estimate, the latter may be considered as reliable. This can be done, in particular, based on the thickness of the leached layer on the Ball's surface.

As noted in Section 2.2, this layer is 1.5 mm thick. It is known that window glass is leached with the rate of some 3×10^{-6} mm/year. Thus, to form a leached layer 1.5 mm thick, it would have taken 500,000 years. But the rate of leaching can hardly be constant: as the thickness of the leached layer increases, the rate inevitably diminishes, since the leaching agents (water, solutions of acids and alkalies) cannot anymore easily reach the glass's surface. Therefore, 500,000 years are just a lower bound of the real Ball's age: in fact it can be assessed at a few million years.

Besides, window glass is constantly exposed to the atmosphere and weather. Bearing in mind that the soft leached layer on the Ball's surface is well preserved, one can conclude that throughout its lifetime the Ball was generally protected from environmental influences, lying in the clay layer. This would further slow down the process of leaching.

All things considered, we can say with reasonable confidence that the leached layer 1.5 mm thick does support the Ball's age of 10 million years, or so.

3.3. Possible versions of the Ball's origin

In the course of this investigation we have analyzed six versions of the Ball's terrestrial (natural, or artificial) origin. All of them proved to be very unconvincing. It was supposed, in particular, that the Ball might have been one of the so-called "gallos", that is balls made of glass, stone, or metal that in nineteenth century were in use on the territory of the Ukraine for ironing the sleeves of shirts and blouses. They ranged in diameter from 50 to 80 mm, what is close to the Ball's diameter.

However, this hypothesis is not in good agreement with black color of the Ball's substance, nor with the strange core (that would be quite useless for a "gallo"). The thick leached layer on the Ball's surface cannot either be explained by this supposition.

Assuming that the "negative mass" result is trustworthy, one can speculate that the Ball is a repository of antimatter that was once used as a source of energy for an extraterrestrial spaceship, which probably crashed on this planet. It is still unknown if antimatter has the property of antigravity, but such a supposition is certainly acceptable.

How the antimatter has been isolated from normal matter during 10 million years? It is seen from Fig. 5 that the core edges are outlined with a distinct dark line. This can hardly be due to

an inner reflection of X-rays from the boundary between the shell and the core. Perhaps, there is at this boundary a very thin layer of an isolating material, such as hypothetical neutrid. This substance, composed of nothing but neutrons, probably occurs in neutron stars (pulsars) [7]. Since neutrons can annihilate only when colliding with antinucleons (antineutrons and antiprotons), and the latter are surrounded in the "antiatoms" by positron shells, neutrid would effectively protect antimatter from annihilation.

True, neutrid density must be as great as $3{\cdot}10^{14}$ g/cm^3 and, therefore, even if the protecting shell had been one neutron thick, its weight would have been 4.2 kg, what exceeds the weight of the Ball as a whole. However, to be impenetrable for electrons and positrons, the neutrid shell must not be necessarily solid. A "net" with a "mesh" of the order of the positron diameter would be enough, and its weight would not exceed 0.5 kg.

As for the Ball manufacturing methods, they can be grasped from its design. The blunt part of the Ball is, in all probability, a hermetic lid that covered and sealed the core. The lid has been welded to the Ball's shell. Evidently, glass at the seal area hardened due to its rapid cooling and therefore became more resistant to leaching.

On the shell's surface there are traces of folds formed when molten glass moved along the Ball's meridians from the direction of its narrow end. The molten glass mass was, most likely, injected under pressure into a mould where had been installed the lid and the Ball's core. Since the core is a little deformed at the juncture of its cylindrical and paraboloidal parts, it may testify that during this process the outer layers of the core slightly melded. This technological process has permitted to form the shell, envelop the core with it and weld together the shell and the lid.

Thus, a number of the Ball's features testify that its designers used engineering methods that seem rational and understandable even from the present-day point of view.

To make sure that the Ball does contain antimatter, it would be necessary:

– to locate unambiguously the Ball's center of gravity with several methods (seven such methods are known at present);

– to determine the Ball's polar and equatorial moments of inertia with the help of a torsion pendulum (one might expect that the relationship between inertial and gravitational masses for antimatter does not differ from that for normal matter);

– to set up and solve a system of three equations in three unknowns (the densities of the shell, core, and neutrid layer between them) — those for the weights, moments, and polar moment of inertia (the equation for the equatorial moment of inertia may be used to check the solution).

If these calculations confirm the "negative mass" result, steps must be taken to withdraw the Ball from its present-day owners. Antimatter is much too dangerous a substance to leave it at the disposal of private persons.

4. Conclusions and some suggestions

1. The Black Ball, found at 1975 in a clay layer at a depth of 8 meters, has the shape of an ovoid with the longer axis measuring 87.5 mm, and the midsection diameter 84.7 mm.

2. X-ray studies of the Ball discovered within it a core occupying a quarter of its volume. The core's height measures exactly half the length of the Ball's axis of symmetry, and its diameter exactly 3/4 of the axis' length. The core is shaped like a regular body of revolution with a smooth surface. It is formed by two conjugate paraboloids of revolution and a cylinder that terminates in a saucer-shaped end face. The core presents its end face to the blunt part of the Ball, being somewhat shifted towards it. The core substance absorbs X-rays some four times less intensively than the substance of the shell. On the Ball's surface, at a level of the core's end face, one can see an edge of the "lid" welded to the Ball's shell. The Ball's and core's axes of symmetry coincide fairly closely.

3. At a meridional section the surface of the Ball is formed by three arcs of three different radii. The angles subtended by these arcs are multiples of the 24th part of a complete circle. All linear dimensions of the Ball (the radii, distances between the arcs' centers, the core's diameter and height, and the diameter of the lid) are multiples of 3.65 mm, what is equal to the 24th part of the length of the Ball's axis of symmetry. These facts provide reason enough to assume an artificial origin of the Ball. Probably, its designer used the base-twenty-four number system and the corresponding systems of angular and linear units.

4. The Ball's shell consists of black glass-like substance (probably, quartz glass), being covered by a soft layer of leached substance, 1.5 mm thick. The time it takes for such a layer to be formed, and the geological age of the clay stratum where the Ball was found are of the same order of magnitude (some 10 million years).

5. Density of the Ball's core was determined using such measurable characteristics of the Ball as its weight, coordinates of the Ball's and core's contours (taken from an X-ray photograph), and the location of the Ball's center of gravity. The result was, however, very unexpected: the core had the property of antigravity, its density being *minus* 4.58 g/cm^3. The shell weighs 980 g, the core *minus* 365 g, the Ball as a whole 617 g. The Ball's volume is 320 cm^3, and its average density 1.93 g/cm^3.

6. Since one cannot rule out the possibility that the "negative mass" result was due to an instrumental error when the Ball's center of gravity was located, the latter measurement must be repeated with several different methods.

7. It is strongly recommended that the Ball be withdrawn from the private persons who own

it at present and deeply studied at scientific research institutes. There may be obtained exceptionally important results that will open principally new vistas in science and technology. Security considerations must also be taken into account.

References

1. Rubtsov V., Morozov Yu. The Discovery by Dr. Gurlt. — In: *Mysteries of the Centuries*. Moscow: Molodaya Gvardiya, 1980 (in Russian).

2. Persinger M.A., Lafreniere G.F. *Space-Time Transients and Unusual Events*. Chicago: Nelson Hall, 1977.

3. *Handbook of Minerals, Rocks, and Fossils*. Moscow: Nedra, 1979 (in Russian).

4. Sokolov V.L., Krasavin L.M. *Handbook of Measures*. Moscow: Vneshtorgizdat, 1960 (in Russian).

5. *World Weights and Measures. Handbook for Statisticians*. N.Y., 1966.

6. Bashmakova I.G., Yushkevich A.P. Origin of the Numbering Systems. — In: *Encyclopaedia of Elementary Mathematics*. Vol. 1. Moscow–Leningrad: Gosudarstvennoye izdatelstvo tekhniko-teoreticheskoy literatury, 1951 (in Russian).

7. Shklovskiy I.S. *Stars: their Birth, Life, and Death*. Moscow: Nauka, 1984 (in Russian).

ANCIENT ROCK POSES A MYSTERY

Robin Collyns

Towards the end of 1978 two boys found an unusual piece of sandstone on a rock-strewn beach in East Auckland, New Zealand.

They gave me the rock for examination and safekeeping. The rock is very hard, light-grey and seaworn. Its grey coloration is due to the presence of calcite (calcium carbonate). The rock measures 85 x 40 x 25 millimeters and weighs 85.05 grams. According to geologists at the University of Auckland some 20 million years ago volcanoes in the Waitakere Range a few kilometers inland ejected sand which washed down to the seashore millions of years ago where it hardened into sandstone.

What appears to be remarkable is what looks like the rust residue of a precision-made artificial metal disc embedded in the rock. Also, part of the sandstone which measures 15 x 9 millimeters covers part of the disc, which indicates that like the sandstone the "disc" is also millions of years old.

In December 1978 I took the rock to a geologist at the Auckland Institute and Museum who remarked that he was "baffled" by the disc. His first thought was that the disc was a limonite "blister" which is a concentration of hydrated ferric oxide. It is not uncommon to see approximately circular limonite blisters on the surface of this type of sandstone which contains ferric oxide; but according to the geologist limonite blisters are raised above the surface level of the rock, while the disc in my rock is set below the surface-level. The geologist remarked that the disc did look artificial but he was at a loss to give an explanation. He mused: "I could make up a good story about it but I wouldn't believe it myself".

The disc is in an exceedingly fragile condition. If it is (or was) artificial it could not have been made from iron or from any other artificially-worked metals we are familiar with, as they would not have lasted. As an example, an iron cannonball left exposed to oxygen and water elements for 10 years will lose 1 % of its mass through oxidization. If the disc was artificial it would have been made from a durable metal or from an alloy we are unfamiliar with, or possibly from an alloy of rare-earth metals (atomic numbers 57 to 71 inclusive). But even an artifact made from an unknown metallic composition is likely to erode or disintegrate in time. The disc that we see today therefore might be analogous to looking at a photographic image for, as a hypothesis, during the gradual process of molecular disintegration of the original metal(s) the



Fig. 1

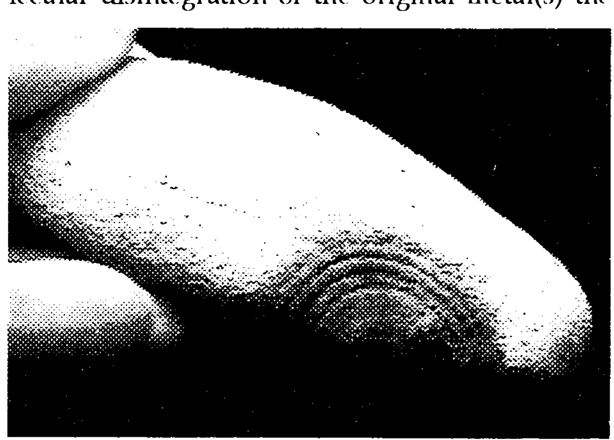


Fig. 2

disc might have absorbed iron oxide from the sandstone by the process of exosmosis thereby giving the disc today its rust-brown appearance.

The disc does not lie flat but is crimped at a 30-degree angle, indicating that it may have been bent by geological pressures or possibly even trodden underfoot and pressed into wet sand thereby partially reducing the effects of oxidization. The disc is folded over the edge of the rock with exactly 180 degrees of the disc embedded on one side of the rock and the remaining arc embedded on the other side. This may indicate that the disc was precisely folded by intelligence. The exact symmetry of the disc continues from one side of the rock to the other.

If the disc could be removed from the rock and set on a plane surface it would measure 30 millimeters in diameter. It exhibits 3 concentric raised circles; each ridge is exactly 1.5 millimeters wide and 1 millimeter high and each ridge is separated by a space of 0.5 of a millimeter. Removal of a small portion of the edge of the disc measuring 4 x 3 millimeters revealed that the remains are of a thin disc only 1 millimeter thick — the disc is not a thickened concentration of limonite. Beneath the part of the disc where the rock had now been exposed an iron oxide staining was apparent which could indicate that the original disc was slowly absorbing iron oxide from the sandstone.

A 12× magnification jeweller's lens revealed what might be the remains of an attachment loop measuring 8 x 6 millimeters. This may indicate that if the disc is artificial it could have been worn around someone's neck or was attached to a garment or a spacesuit.

I have seen several limonite blisters on the surface of sandstone; some have concentric circles. But I have never seen any blisters or concentric circles which look artificial like my disc. Nor do any of the blisters exhibit the precise symmetry of my disc.

The rock was exhibited at the Seventh World Conference of the Ancient Astronaut Society which was held in Auckland in July, 1980. During his address at the Conference Dr. Philip A. Ianna, then Associate Professor with the Department of Astronomy at the University of Virginia, said that in seeking "hard evidence" to prove Ancient Astronaut visitations the rock "is a very impressive start in the right direction".

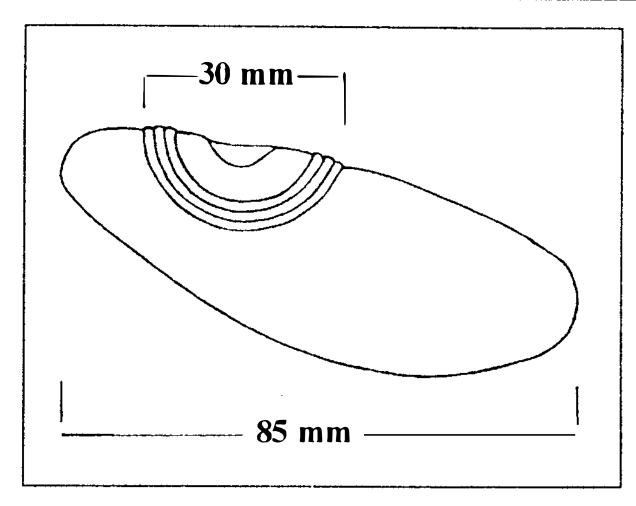


Fig. 3

The rock was also featured in a 50-minute New Zealand made television documentary of the Conference. Stephen La Hood, the programme Director, remarked in an interview with the Auckland newspapers the *New Zealand Herald*, that: "one of the most interesting things to emerge from the Conference was a small stone found at a beach which has a processed metal disc embedded in it".

On April 27, 1994, the rock was again featured on a New Zealand television programme. The *Eyewitness UFO* documentary was made for channel TV2 in Auckland. Ian Wishart, the reporter, said: "...but it may be this piece of sandstone that provides the most puzzling evidence of any of New Zealand's UFO cases. Embedded in the rock is what appears to be the fossilized remains of a metallic disc. There are grooves evenly spaced, and in parts the sandstone actually covers part of the disc".

In summary, if the disc is artificial our imagination could take flight regarding its purpose. Perhaps it was an ornament or an amulet? But this would seem unlikely if it was the product of a technically advanced civilization. What could seem more likely if the object is or was artificial is that it was an identity disc, possibly containing personal data stored magnetically. If this is the case it would be a momentous revelation, an electronic time capsule in miniature, if such magnetic data could still be retrieved and heard and/or screened. But this is probably no longer possible for if the disc was artificial the shifting sands of time and the changing seas of eternity have evidently destroyed the original metal and left us with a tantalizing remnant, an image, of what may have been a visit to Earth by a space civilization millions of years ago.

Or, is the "disc" natural after all?

ERRATUM

In the article *The Petrozavodsk Phenomenon* by L.M.Gindilis and Yu.K.Kolpakov, which appeared in Vol.2, No.2-3, on p.9, Fig.9, the dates ("Nov.19, Nov.20, Nov.21") should have read: **Sept.19, Sept.20, Sept.21**. We tender our apologies to the authors of the article.

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